Meeting Objectives

WG Quarterly Meeting
Boston, MA
June 25, 2002

Introduction

- ***Goal is an integrated Roadmap R&D plan***
  - ***Focused on selected systems (including their fuel cycles) and high-potential options***
  - ***Coordinated, with appropriate emphasis of cross-cutting areas***
  - ***Time phased and prioritized***

- ***RIT has developed an Interim Roadmap draft***
  - ***Does not yet include R&D***

- ***Interim Roadmap and R&D recommendations will be reviewed at the Rio de Janeiro GIF meeting***

- ***Our main objective for this meeting is to prioritize and coordinate the R&D recommendations***

Key R&D Issues

- ***Priorities and time phasing***
  - ***Budgets not known and thus can't be specified as constraints; will require scheduling judgments***
  - ***~5 year period to resolve key viability issues, followed by performance R&D phase***

- ***Emphasis placed on concept-specific vs. crosscutting activities***
  - ***High priority R&D that advances multiple concepts will be identified***
  - ***Scope and importance of fuel cycle issues warrants added emphasis***

- ***Bridging from nearer term systems***
  - ***Develop self-contained R&D recommendations for Gen IV systems***
  - ***Identify relevant R&D proposed in nearer term initiatives (e.g., gas turbine technology for GFR)***

R&D Phases

- ***Viability establishment phase***
  - ***Prove basic concepts, technologies and processes at relevant conditions***
  - ***Identify and resolve potential "show-stoppers"***
  - ***Specify most promising technical options***

- ***Performance qualification phase***
  - ***Contingent on successful completion of viability R&D***
  - ***Verify system capabilities at engineering scale in prototypical conditions***

- ***R&D endpoints for each phase are specified in EMG Final Screening Report***

Concepts

TWG1	***SCWR***
TWG2	***VHTR*** ***GFR***
TWG3	***Na LMR*** ***Pb/Pb-Bi Battery***
TWG4	***MSR***

Principal Products of This Meeting

- ***Updated R&D worksheets***

	Technical gap/issue				R&D items				
Sub-System	Gap Label	Brief Description of Gap/Issue	Signific. of Gap *(a)*	Current TRL *(b)*	Activity Label	Brief Description of R&D Activity	Priority *(c)*	Time *(d)*	Estimated Cost Range (Million USD)
Fuel	F1		V	2	F1a		1	S	1-2
	F2		P	1	F2a		2	M	2-5
					F2b				
					F2c				
	...		P	2					
Coolant	C1								
	...								
...									

a Relevance of technology gap: V = concept viability, P = performance, O = design optimization
b Technical readiness level (1, 2, 3, 4, or 5); see EMG Final Screening Document
c Priority of R&D activity:
1 = critical (needed to resolve a key feasibility or viability issue)
2 = essential (needed to reach a minimum targeted level of performance, or to resolve key technology or performance uncertainties)
3 = important (needed to enhance performance or resolve the choice between viable technical options)
d Time required to perform R&D: S = short (<2y), M = medium (2-5y), L = long (5-10y), VL = very long (>10y)

- ***Five page R&D summaries for each of 6 concepts and 5 crosscut areas***
- ***Top level Gantt/Pert Charts to illustrate schedule***

R&D Planning Areas for Each Concept

- ***Fuel, coolant, other materials***
- ***Reactor systems***
- ***Balance of Plant and energy products***
- ***Fuel Cycle***
- ***Safety***
- ***Economics***

Meeting Organization

- ***Plenary Session***
  - ***Presentation of recommended R&D for 6 selected systems***
- ***WG breakout sessions***
- ***Meetings of RIT with leaders of each WG***
  - ***Review R&D recommendations: completeness, justification, etc.***
  - ***Address priorities and allocation to concept-specific vs. crosscut R&D categories***
- ***Joint meeting with all WG leaders***
  - ***Resolve issues***
  - ***Enhance consistency of treatment***
- ***Writing of R&D Planning summaries***

WG Breakout Assignments

- ***Work on R&D priorities and phasing***
- ***Update R&D spreadsheets***
- ***Develop high-level Gantt/Pert Chart***
- ***Prepare for writing 5 page summaries***

- ***Time permitting***
  - ***Determine facility requirements***
  - ***Refine cost estimates***

Backups

Proposed R&D Scope Template

For each concept/subsystem

- ***Background: current state of development/knowledge***

- ***Gaps: required or desired improvement***
  - ***Characterize significance to system feasibility or performance***
  - ***Use EMG Technical Readiness Level scale***

For viability R&D phase (emphasized) followed by performance phase

- ***R&D activities***
  - ***Trade-off studies and analyses***
  - ***Experiments and facility requirements***
  - ***Advances in measurement and modeling capabilities***

- ***R&D linkages/dependencies***
  - ***Relation to R&D on other systems (existing, evolutionary or Gen IV)***

- ***Schedule and cost for each major activity (>$1M up to $10-50M)***
  - ***Indicate major review/decision points (e.g., down-select among options)***

R&D Topics Assigned to Each Crosscut Group

Fuel Cycle

- *Fuel Cycles*
- *Mining*
- *Enrichment*
- *Reprocessing*
- *Transmutation*
- *Waste disposal*

Risk and Safety

- *Static & transient analysis*
- *Design basis analysis*
- *Instrumentation and control*
- *Balance of plant*
- *Probabilisitic risk assessment*
- *Personnel safety*

Economics

- *Economic models*
- *Modularity*
- *Constructability*
- *Standardization*
- *Economics of operation*
- *Power conversion*

Fuels & Materials

- *Fuel, cladding, absorbers*
- *Fabrication*
- *Fuel testing*
- *Spent fuel behavior*
- *Structural materials*
- *Materials compatibility and testing*

Energy Products

- *Electricity*
- *Hydrogen production*
- *Desalination*
- *District & process heat*
- *Cogeneration*

List of "subsystems"

- *Fuel*
- *Coolant*
- *Reactor systems*
  - *Reactor core*
  - *Heat transport*
  - *Monitoring, control, safety protection*
  - *Refueling*
  - *Structures and containment*
- *Balance of Plant*
  - *Energy products*
- *Safety concept and performance*
- *Fuel cycle*
  - *Spent fuel management*
  - *Fuel recycle technology*
    - » *Separations*
    - » *Refabrication*
    - » *Waste form development*
  - *Safeguards*